# LLNL Lessons Learned LLNL

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## Missing Gasket in a Powered Air Purifying Respirator

An MSA OptimAir MM2k powered air-purifying respirator (PAPR) was recently returned to LLNL Respirator Services without a gasket in the filter receptacle (see Figure 1). This respirator has a fitting for one high-efficiency particulate air (HEPA) filter cartridge located on the side of the motor/blower assembly.

No exposure resulted from the missing gasket because of the conditions of use. The respirator had been leak-tested before it was issued, a standard procedure for all tight-fitting respirators. Because of the missing gasket, this respirator was leak checked again after it was returned, and no leakage was detected.

Respirator Services' inspection procedures have been amended to ensure that the presence of respirator gaskets is checked before the filter cartridges are attached and the unit is bagged for issue.

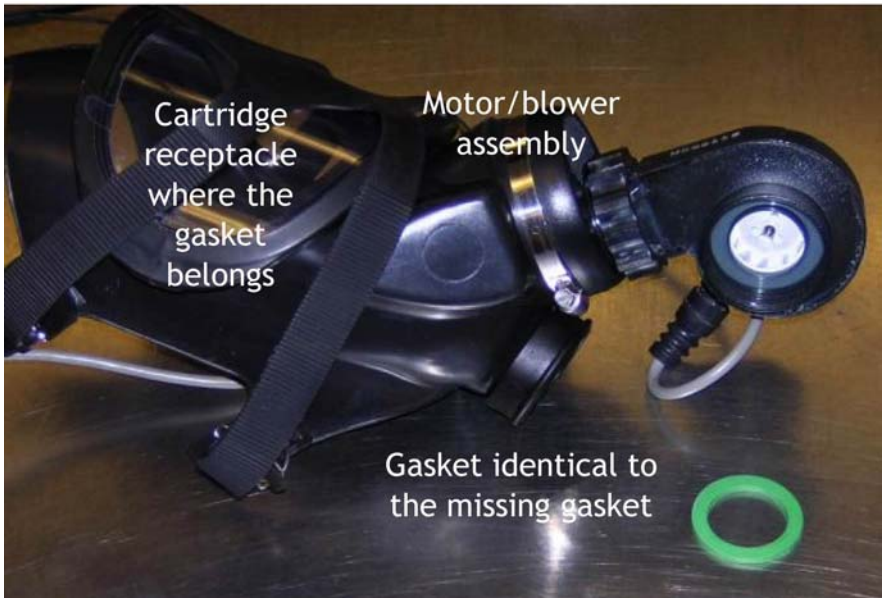


Figure 1. PAPR with missing gasket.

The photos on the next page show where the gasket should have been installed. Figure 2 shows the filter cartridge with the installed gasket circled, and Figure 3 shows the gasket filter cartridge installed without the gasket. Note the gap between the cartridge and the cartridge receptacle is narrower in Figure 3 because the gasket is missing.

Figure 2. Gasket installed between PAPR unit and filter cartridge.

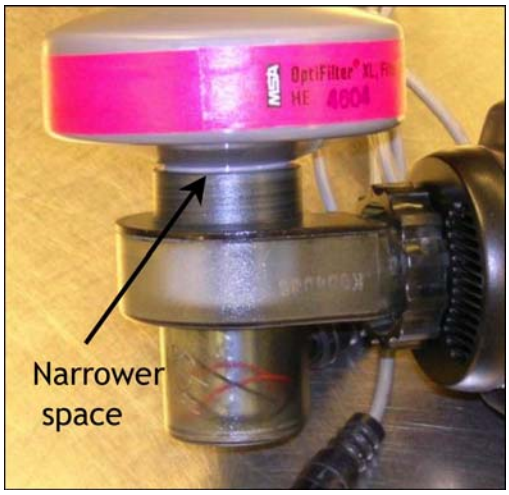


Figure 3. Filter cartridge installed without gasket.

## Analysis

- LLNL Respirator Services leak tests all tight-fitting respirators before issue.
- It is probable that the gasket was not installed in this particular respirator before it was issued to the user.
- Removing the filter cartridge for any reason could also lead to loss of the gasket.
- Wearing a respirator with a missing gasket could result in exposure if the respirator is used in a hazardous atmosphere.

## Recommended Actions for LLNL Employees

1. Inspect respirators for visible signs of damage or missing parts before use but avoid disassembling any part of the respirator to look for damage or missing parts.

   **Note:** All personal protective equipment, from gloves to face shields to hard hats, should be inspected before use.

2. Report any suspicious respirators to your ES&H Team or Respirator Services to avoid potential exposures. Obtain a replacement mask if there are any doubts about the condition of the respirator. Visually check masks for the following before donning:
   - Tears, creases, cracks, or punctures in the mask,
   - Broken or worn straps,
   - Missing inhalation valves (visible by flipping the mask over and looking for the valves on the inside),
   - Broken or frayed battery cables on PAPRs, and
   - Missing gaskets that are visible without disassembly.

3. Never remove, loosen, or adjust fixed parts of a respirator such as the motor/blower assembly of PAPRs or the cartridges or cartridge holders of any air-purifying respirator, unless specifically authorized to do so. Limit the adjustments you make to the straps and spectacle inserts.
4. Unless specifically authorized, use respirators for up to eight hours, which can be spread over five work days, then return to Respirator Services in accordance with established policy.
5. Decontaminate respirators and discard cartridges, when necessary, before returning them to Respirator Services.
6. Replacement respirators that have been cleaned, sanitized, serviced, inspected, and leak-tested will be issued if needed. The commonly used P100 and HEPA filter cartridges are also penetration-tested before being installed on the respirators.